

# Virtual Reality Immersion System

## ABSTRACT

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A virtual reality immersion system provides a head mounted display that contains a video camera and a video display. A plurality of target markers are distributed within a virtual environment room where each target is distinct from all other targets in the virtual environment room and distinct from rotated versions of itself. An

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automatic calibration program selects pair of targets from an image from the video camera. The selected pairs of targets are identified and the position of each target is calculated relative to the camera and relative to each other. The positions of each target pair are added to a list of relative target transforms. Video signals are processed to calculate the position of targets detected in each frame image using

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the relative target transforms and the effects of viewing angles are detected and a higher weight is given to targets that are detected at more reliable angles. The invention dynamically streams 3D content to the user through the video display.

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Once the target positions have been calculated, the invention determines the user position within the environment and when the user changes his viewpoint, the information from the calculated user position is used to change the position and angle of the 3D content and the 3D content is repositioned and streamed to the video display.